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SOME OBSERVATIONS ON DERMESTES.

BY CAROLINE E. HEUSTIS, ST. JOHN, N. B.

Having read in the Report of the Entomological Society of Ontario for 1877 an article by Prof. J. T. Bell, of London, Ont., entitled "How to Destroy Cabinet Pests," I thought it might not be unprofitable to record my own observations on *Dermestes*.

Early in the summer of 1876 I captured four beetles, three males and one female, and placed them in a glass jar with a piece of the meat on which I found them feeding. I observed the female deposit a number of eggs on the meat, but before any were hatched I left home, and was absent about five weeks. On my return I found a large and flourishing colony of larvæ, most of them full grown.

My object in rearing these insects was not to study their natural history, but to find out the best means to destroy them. I put a piece of camphor gum in the glass as a first experiment. The effect on them was very slight. They appeared a little uneasy at first, but in a minute or so commenced crawling over the camphor quite unconcerned. I had heard of a clothier who rolled tallow candles up in webs of woollen cloth to preserve them from the attacks of "moths," and I resolved to try its effects on *Dermestes* larvæ. With this view I put a small piece of tallow in the glass, and the effect was almost instantaneous. It was quite ludicrous to see the stampede which commenced. Never did insect evince more terror or disgust than did these pests. They fled pell-mell to the side of the jar, but as there was no way of escape, they were obliged to yield to "circumstances over which they had no control." The closest observation failed to detect one going near the tallow. They remained for several days huddled together by the side of the jar in a confused mass.

Satisfied with my experiment, and being very busy at the time, I put the jar away, and on looking at it about a fortnight afterward, I found but one beetle, and that one *dead*, of all that large family. As all the larvæ and three of the four beetles had disappeared and "left no trace behind," I naturally concluded that they had been driven by starvation to prey upon each other. There was no possibility of escape from the jar, and my conclusion seems reasonable, even if I cannot prove it.

I have ever since kept tallow in trunks or presses where there are woolen garments, blankets or furs, and I have had nothing eaten up to the time of writing. In preparing my boxes for mounted specimens, I put bits of tallow between the strips of cork and cover with paper gummed to the sides of the box, and I have not had a single specimen injured by *Dermestes* or any other cabinet pest. As tallow is cheap and can be obtained in either town or country, I would heartily recommend it to both housekeepers and naturalists. To the former it would be much better and less disagreeable than the snuff, tobacco, pepper and other preventives which are put on furs with such unsatisfactory results. Although such a remedy as Prof. Bell recommends might do for the cabinet, it would be neither pleasant nor safe to have about our clothing.

MAMMALS ATTRACTED BY SUGAR.

BY JAMES S. BAILEY, A. M., M. D., ALBANY, N. Y.

It has not been supposed that animal life would be attracted by sugar, but while sugaring for Lepidoptera the contrary has been proven. On a number of occasions we have taken deer mice while in the act of feeding on sugar, and more recently we have taken a flying squirrel while lapping the sweet on a sugared patch.

Not long since, in making our rounds while sugaring, we discovered a skunk endeavoring to taste the sugaring, and so intent was he that our

approach was unobserved until a piece of dead wood was hurled at him, when he reluctantly left. The throwing of a second missile quickened his pace and caused him to distribute his perfumery, which rendered the air rather more fragrant than Lubin's Ext. of new-mown hay. It is unnecessary to state that our recreation for the evening was at an end.

We have frequently taken at sugar tree toads and various species of Coleoptera. A Texan correspondent says it is not uncommon for him to take at sugar Scorpions, and also species of Lizards, which are numerous in that latitude.

TETRAOPES TETROPTHALMUS FORST.

BY W. L. DEVEREAUX, CLYDE, N. Y.

In the early part of June, 1876, while plowing through a patch of *Asclepias cornuti* (the plant upon which beetles of the above genus are found), I observed numerous Cerambycidian larvæ in the bottom of the furrow, stirring about in the soil. Two of the larvæ were put in a glass jar with a growing milk-weed plant. Although they were put in the soil near the roots, they soon came to the surface and wriggled about for a week, and then pupated, and finally came out perfect specimens of *T. tetrophthalmus*.

I have endeavored to find them in or about the roots of the milk-weed since, but have failed to find a trace of any. To judge from the black scars and other appearances of the roots, it seems the larvæ live in the soil and wound the roots with their mandibles, and thereby subsist on the milk or juice which flows so readily at the slightest abrasion.

Recently I saw a larva of *Corymbites cylindriformis* which had captured an imago of *Harpalus Pennsylvanicus*. It had crushed in one elytron with its mandibles, and still held it firmly, though the beetle was striving hard to get away.

THE GENERA OF THE HESPERIDÆ OF THE EUROPEAN FAUNAL-REGION.

BY DR. A. SPEYER.

(Translated from the Stettiner Entomologische Zeitung for 1878, pp. 167-193.)

(Continued from July No., p. 129.)

Among the North American species known to me in nature, there is not one identical with, or even similar to any European; and the opinions of prominent Transatlantic colleagues, as to whether identical species occur in the two countries (*Scel. centaureæ* excepted, which is common to the Arctic regions of both continents) are very far divergent. Edwards on the authority of Boisduval cites in his Catalogue, *Sylvanus* and *Tages*, and besides, also, *comma* as American; while he places *Pamph. Fuba*, *Manitoba*, *Colorado*, *Nevada* and *sylvanoides** (which are regarded as good species by Scudder) as varieties of *comma*. I refrain from expressing any opinion in this question of species, not knowing any of the forms. As to *Sylvanus* and *Tages*, I would prefer to drop them from the list until their right to be classed among the indigines of America shall have been based upon more reliable authority than that of Boisduval. If we may trust Lederer's statements, Boisduval's Californian *Tages* var. *Cervantes*, would appear to be not only a distinct species, but also of a different genus from *Tages*; for it is said to deviate "not only in coloring, design and in its diaphanous, glassy spots, but also in the cut of the wings and in the posterior legs of the male, which have only apical spurs and a long hair-pencil" (*Wiener Entom. Monatschr.*, 1857, p. 78). Thus there would remain no resemblance whatever to *Tages*, and the carelessness shown in declaring identical two such radically distinct forms, would hardly be expected even from Boisduval, although he is so little scrupulous in such matters. Possibly Lederer's statements may have resulted from a confusion of species.

* In the *Memoirs of the Boston Soc. N. H.*, Vol. II, P. III, No. IV, these species, and also *comma*, are minutely described and well figured, and the anal appendages (which Mr. Scudder estimates as of special value) are explained. He also represents, in the same paper, the times of appearance of the species as different.

The friendly assistance of Messrs. Grentzenberg, Moeschler and Dr. Staudinger have placed me in a position to bring together, with but a few exceptions, the known Hesperidæ of the European Faunal-region. To the latter gentleman, especially, I am indebted for a knowledge of the Eastern-Asiatic species, so difficult to reach. But four of these have remained inaccessible to me, namely, *Pamphila sylvatica* Brem., *Pyrgus gigas* Brem., (possibly only a var. of *tessellum* H.), *Eudamus guttatus* Brem.-Grey, and *Thanaos popoviana* Nordm. It seemed to me more advisable to leave out these altogether, than to give them a place which their particular investigation might not warrant. In the arrangement I have placed first, those genera which, from the absence of the tibial epiphyses and generally of the middle-spurs of the hind-tibiæ, are closely related to the other *Rhopalocera*; and last, those which carry their wings when at rest in the manner of the moths. I do not, however, intend to assert that these particular features are of paramount importance in a systematic arrangement of the Hesperidæ.

It would be very desirable to divide this large family into convenient groups, but, if it were possible, it would be difficult to find exact distinctive characters for them. Mr. Scudder has made an attempt in this direction. He believes that he is justified in adopting two large groups corresponding nearly to the Fabrician genera *Thymele* and *Pamphila*, and calls the one HESPERIDES and the other ASTYCI, the latter a name chosen by Hübner for the whole family. To the latter would belong 1 to 4 of the European genera given below, and to the former 5 to 9. The most important character of the Hesperidæ (for the other differences which he adduces are not valid) Mr. Scudder describes in the following words:—"In the male HESPERIDES the posterior extremity of the alimentary canal is protected beneath by a corneous sheath, which extends beyond the centrum or body of the upper pair of abdominal appendages, sometimes nearly to the extremity of the appendages, carrying the vent beyond the centrum; while in the ASTYCI, the extremity of the canal is not protected by any extruded sheath, but opens at the very base of the inferior wall of the centrum." (*The two principal Groups of Urbicolæ*. By S. H. Scudder. *Bull. Buffalo Soc. Nat. Science*, I, 195.)

I have not examined the abdominal appendages of the male Hesperidæ, and therefore, I do not know whether this corneous anal sheath would really supply a generally valid mark of distinction between the two tribes of Mr. Scudder. But even if that be not established,—as I fear it

will not,—there appears to me to be no ground for refusing to those two great groups a certain natural right, at least so far as concerns the Europeo-North American Fauna. A costal-fold occurs only in the males of the one group (although not invariably), and a stigma only in those of the other (but still less constantly). The spines of the tibiae while here a rule, are there a rare exception. There appears, moreover, a difference in the color, in so far that the usual black or dark brown ground-color in the Scudderian *ASTYCI* is very often reduced or quite supplanted by reddish yellow in the *HESPERIDES*. The remarks of Mr. Scudder relative to the early stages of these insects will scarcely be supported by extended observations so as to be fully conclusive.

Of the eggs he states that those of the *HESPERIDES* are always distinctly ribbed in the vertical direction, and almost invariably higher than broad, whilst on the other hand, those of the *ASTYCI* are broader than high, smooth and pretty regularly hemispherical. "The caterpillars of the *HESPERIDES* feed usually on leguminous plants [but this is not true of the European ones] and dwell in horizontal leaf-cases; while the *ASTYCI* feed on grasses [but not all] and build vertical cases between the blades."

In the nomenclature of the genera I have followed Herrich-Schæffer's *Prodromus*, without being able (because of the insufficiency of my literary material) to guarantee their unexceptional authority.

I now present, first, a Systematic Synopsis of the species of the European-region which I have investigated; then an Analytical Table of the genera, and lastly will follow the more precise description of their generic characteristics.

HESPERIDES Latr.

1. CYCLOPIDES H. (p.)

- 1. *Morpheus* (Pap. m.) Pall. *Steropes* WV.*
- *2. *Ornatus* Brem.

2. CARTEROCEPHALUS Led.

- 1. *Palaemon* (Pap. p.) Pall. = *Paniscus* F.
- 2. *Silvius* (Pap. s.) Knoch.

[* This Synopsis is copied *literatim*, except that the original is without the digram æ.—L.]

*3. *Argyrostigma* (*Steropes* a.) Ev.3. *THYMELICUS* H. (p.)1. *Lineola* (Pap. l.) O.2. *Thaumas* (Pap. th.) Hufn. *Linea* WV.*3. *Hyrax* (Hesp. h.) Led.4. *Actæon* (Pap. acteon) Rott.A 4. *PAMPHILA* F. (p.)1. *Comma* (Pap. c.) L.2. *Sylvanus* (Pap. s.) Esp.*3. *Ochracea* Brem.

(Ætna Bdv. spec. Americana ?)

B (*Goniloba* HS.).*4. *Alcides* (Hesp. a.) HS.C (*Goniloba* HS.).*5. *Mathias* (Hesp. m.) Fabr.† = *Thrax* Led. non Lin.*6. *Zelleri* (Hesp. z.) Led.7. *Nostrodamus* (Hesp. n.) F. = *Pumilio* O.

D.

*8. *Inachus* (*Pyrgus* i.) Mén.5. *CATODALIS* n. gen.‡*1. *Tethys* (*Pyrgus* t.) Mén.6. *PYRGUS* H. (p.)A. a. (*Carcharodus* H. *Spilothyrs* Bdv.).1. *Lavateræ* (Pap. lavatheræ) Esp.2. *Althææ* (Pap. althææ) H.Var. b. *Bæticus* (Spil. b.) Ramb. = *Floccifera* Zell.3. *Alceæ* (Pap. a.) Esp. = *Malvarum* O.

A. b.

4. *Proto* (Pap. p.) Esp.

† The name, which has also been accepted by Kirby, rests upon the authority of Felder: "H. *Thrax* Lin., Don. (haud Led. Verhandl. Zool.-Botan., Ver. 1855, p. 194, taf. 1, f. 9, 10, which is H. *Matthias* Fabr., in tota India vulgaris)." *Wien. Entom. Monatschr.* 1862, p. 183.

‡ Kato *subtus*, *daulos hirtus*.

5. Tessellum (Pap. t.) H.
*Var. b. Nomas (Hesp. n.) Led.
 6. Cribrellum (Hesp. c.) Ev.
B. a.
 - *7. Poggei (Hesp. p.) Led.
B. b.
 8. Phlomidis (Hesp. phl.) HS.
 9. Sao (Pap. s.) H. = *Sertorius* O.
 10. Orbifer (Pap. o.) H.
7. SCELOTHRIX Ramb.
- *1. Maculata (Syrict. maculatus) Brem. et Grey.
 2. Sidæ (Pap. s.) Esp.
 3. Cynaræ (Hesp. c.) Ramb.
 4. Carthami (Pap. c.) H.
 5. Alveus (Pap. a.) H.
Var. b. Fritillum (Pap. fr.) H.
Var. c. ? Cirsii (Hesp. c.) Ramb.
Var. d. ? Carlinæ (Hesp. c.) Ramb.
 6. Serratulæ (Hesp. s.) Ramb. HS. *An præced var. ?*
Var. b. Cæca (Hesp. cæcus) Fr.
 7. Cacaliæ (Hesp. c.) Ramb. HS.
 8. Andromedæ (Syrichth. a.) Wallengr.
 9. Centaureæ (Hesp. c.) Ramb.
 10. Malvæ (Pap. m.) L. = *Alveolus* H.
Ab Taras (Hesp. t.) Meig.
*Var. b. Melotis (Hesp. m.) Dup. = *Hypoleucus* Led.
8. NISONIADES H. (p.)
- *1. Montanus (Pyrgus m.) Brem.
 2. Tages (Pap. t.) L.
9. THANAOS Bdv. (p.)
1. Marloyi Bdv. = *Sericea* Fr.

Those which occur only in Asia are marked with a star (*). I deem it unnecessary to give more special localities and citations, since both are to be found in Staudinger's Catalogue.

Diagnostic Table of the Genera.

- A. Anterior tibiae without the appendage (Hind tibiae, as a rule, with only one pair of spurs).
- a. Antennae less than half the length of the front-margin of the fore wings. Apical joint of the palpi thick, blunt, conical. Body very slender. 1. CYCLOPIDES.
 - b. Antennae half as long as the fore wings; apical joint of the palpi slender, conical, rather acute, clothed all around with hairs from the middle-joint to the end. Body stouter. 2. CARTEROCEPHALUS.
- B. Anterior tibiae with appendage, hind tibiae with two pairs of spurs.
- a. Antennal club ovate or elongate, without a hook or acute point at the end.
 - a. Apical joint of the palpi slender, subulate, erect. . 3. THYMELICUS.
 - b. Apical joint of the palpi short, conical.
 - o. Hind-tibiae of the ♂ without a pencil of hairs.
 - x. Fringe unicolored, club of antennae curved, ♂ without costal-fold. 9. THANAOS.
 - xx. Fringe checkered. 6. PYRGUS A. & B. b.
 - oo. ♂ with costal-fold, and tuft on the tibiae. . . 7. SCELOTHRIX.
 - b. Club of antennae lunate-falcate; ♂ with costal-fold, and without the tuft on the tibiae. 8. NISONIADES.
 - c. Club of antennae slender, fusiform, at about two-thirds of its length bent at right angles; ♂ without costal-fold, but with tibial tuft. 5. CATODAULIS.
 - d. Club of antennae ovate or oblong, with a little hook or point at the end. Either with costal-fold or with tibial tuft. 4. PAMPHILA A, C and D.
 - e. Club of antennae oblong, the apical fifth slender and somewhat bent up, and rounded at tip. The rest as in d. 4 PAMPHILA B.
 - f. Club of antennae bent behind the middle, thence narrowed to the tip. All the rest as in PYRGUS B. . . 6. PYRGUS B. a.

CYCLOPIDES—CARTEROCEPHALUS.

The exotic species unknown to me should answer the question, whether the separation of these two genera could be directly sustained. Lederer has separated *Carterocephalus* particularly on the ground of the absence of the middle-spurs; but this difference is not decisive. *Cyclopides ornatus* has only apical spurs, whilst in other respects it is close to *Morpheus*. The different habitus and the striking differences in the palpi, etc., have determined me to accept the separation provisionally.

If the genera should be united (*Cyclopides*), there will be besides the want of the tibial-epiphysis (which separates them from all the other Hesperians known to me), the following characters common to them: Club of antennæ elongate oval, terminating conically, slightly curved. Apical joint of the palpi conical, projecting almost horizontal. Tibiæ armed with spines, at least the middle ones. Abdomen longer than the head and thorax united, the posterior wings uplifted. Male without the costal-fold, the stigma, and the tuft on the tibiæ.

CYCLOPIDES. Antennæ short, the club of smaller size. End-joint of the palpi thick, bluntly conical, rather free. Body slight, with short thorax, and very long, slender abdomen; the latter somewhat compressed and only sparingly pilose. Wings comparatively large, not remarkably hairy; the hairs along the inner margin of the slightly developed, abdominal suture of the upper surface of the hind wings can only be recognized by very close examination. Hind tibiæ with two pairs of spurs (*Morpheus*), or with only one pair (*ornatus*).

Of *ornatus* I have been able to examine only one specimen (from the Amur, Staudinger), which appears to me, because of the slender abdomen, to be a male; but I cannot be quite sure of the sex. It was much narrower-winged than the male *Morpheus*, and in this respect agreed better with the female of the European species.

This genus appears not to be represented in North America.

CARTEROCEPHALUS. Antennæ equal to half the length of the fore wings, with elongate-ovoid club. Apical joint of the palpi slender, conical, moderately acute, quite concealed by the long hairs of the middle joint. Body moderately robust, with thickly haired (in *argyrostigma* also very long haired) abdomen. Surface of the wings more hairy, with notably a conspicuous streak of still longer and thicker, prominent hairs along the inner margin of the abdominal suture of the hind wings.

Here belong, according to Edwards, two North American species, *Mandan* Edw. and *Omaha* Edw., which last was separated by Scudder (*System. Rev. of Amer. Butterflies*, p. 54) from *Mandan* into a genus, *Potanthus*.

THYMELICUS.

Antennæ half as long as the fore-wings, with elongate-ovoid, conically-tipped club. Apical joint of the palpi nearly erect, moderately long and slender, subulate, hidden to beyond its middle by the long, stiff hairy clothing of the middle-joint. Middle tibiæ with a longitudinal series of short spines. Hind-wings somewhat produced at the inner angle. Male with a discoidal stigma, without a costal-fold, and without a tibial tuft.

It differs from the next related genus *Pamphila* in the slender, subulate apical joint of the palpi and in the absence of the hooklet on the end of the antennal club (*Pamph. Alcides*, in which the antennal hooklet is curved, has a very short, thick, conical apical joint to the palpi).

Edwards places here two North American species which are unknown to me—*Hylax* Edw. and *Garita* Reak.* The Texan species, *Waco* Edw., placed by Scudder in *Thymelicus* must, because of essential differences, form a separate genus, *Copæodes*,† to which, according to Edwards, *Arene* Edw. also belongs.

PAMPHILA.

Club of antennæ ovate, or elongated, on the end more or less curved into a much thinner, acute hooklet, which may be shorter or longer, but always shorter than the club itself. The length of the hooklet depends upon the number of the antennal joints of which it consists (in the American *Phylæus* Dr. it is represented by the single terminal joint which sets upon the thick end of the club in the form of a short spine). Palpi placed close to the front, at most extending a little beyond the eyes, the middle-joint broad anteriorly, closely set with long, brush-like hair-scales; the apical joint conical, either short and thick, or moderately long and more slender, yet not so thin and subulate as in *Thymelicus*. Tibiæ

[* Dr. Speyer has subsequently received these two species from Mr. von Meske, and finds them to be true *Thymelicus*.—L.]

† *Kopaiodes*—Oar-shaped, having reference to the form of the hairs of the little curl at the base of the antennæ.

unarmed in some species, but with spines in most, which are the stronger upon the middle tibiae. Body robust, the abdomen as long as the head and thorax united. Wings relatively small, stiff, the anterior ones triangular, the posterior ones short, mostly produced at the inner angle, particularly in the male. The anterior wings generally have a stigma, but no costal fold; and the tuft is absent from the tibiae.

- A. Club of antennae thick, with a sharp apical hooklet. Vein 2 (i. e., the first branch of the median) of the fore-wings originates much nearer to the base than to the hind margin of the wings, and is almost twice as long as is the trunk of the median vein to its end. Stigma of the male fore-wings in its normal position, or absent (in the European species it is present).
- B. The last fifth of the elongated club of the antennae slender and bent backward, but rounded out at the end. Second vein as in A. Male without the stigma.
- C. Antennae as in A. Vein 2 originates at, or a little before, the middle of the wing, and is not, or only a little, longer than the trunk of the median. Stigma absent, or when present directed more towards the outer margin and reaching only to the first vein.
- D. Club of the antennae more slender and more fusiform, with acute but less sharply defined apical hooklet. The second vein starts in the middle of the wing. Fringe light-colored; at the end of the veins spotted with dark color (in A B and C not spotted). Male without the stigma.

Our two common Central European species (Div. A) are typical of this great world-wide genus, with which agree, in all essential characters, such as structure of the antennae, neurulation of the wings, etc., the greater number (21) of the North American species known to me in nature. The genus is far too comprehensive and varied to be left without analysis, but this desideratum must await a general classification. In the length of the antennae, the form of the club and its apical hooklet, in the spines of the tibiae, cut of wings, in the presence or absence of the stigma, and in its structure, manifold differences are displayed; these, however, admit of no arrangement into natural groups, if one would avoid shattering the genus in an unwarrantable manner. The greater number of the species which I have studied (including the American) have spines on the tibiae—in

some on all the tibiae, in others on the middle and posterior ones, or on the middle tibiae alone. Not less are there all degrees of transition apparent, from the feeblest and least perceptible, to those with the long and stout spines. In order to understand that no natural division can be based upon such differences as these, one needs only to place those without the spined tibiae in comparison with the others. The same value must be placed upon the stigma of the fore wings of the male; it is present in the greater number of the species, at least in the typical (Div. A), but even in a few of these it is wanting, which in other respects do not differ. Perhaps the neurulation of the wings supplies better points of support for the division of those species here united into natural genera. The different origin of the first branch of the median vein of the fore wings does not offer available characters because it does not yield sharp limitations. While in some species (*Mathias*, *Zelleri*, *Inachus*) the trunk and first branch of this vein have the same length, the point of departure of the latter in others (*Nostradamus*, *Osyka* Edw.) is nearer the base, and thus forms a transition to the normal form in about one-third of the length of the wings. Whether the origin of the discoidal vein of the fore wings yields a sufficient characteristic for a true genus *Pamphila*, as Felder supposes (*Wien. Ent. Monatschr.* 1862, p. 483), I have not ascertained.

Scudder (*Syst. Revis. of American Butterflies*) has separated the here included species into numerous genera, but unfortunately has not supplied diagnoses; and from the list of the species alone, the grounds for this separation do not become clearly evident.

The single species of Division B, *Alcides* HS., deviates from all the others here united, in the rounded tip of the antennae, and should therefore, strictly speaking, be separated, since the acute tip of the apical hooklet of the club is an essential character of the genus. Besides that, it has another peculiarity. According to Herrich-Schäffer's statement (*System. Bearb. d. Schmett. v. Eur.*, vi., 38), the male of this species has only 2 spurs on the hind tibiae (♀ 4, as usual). Lederer (*Wien. Ent. Monatschr.*, 1857, 79) remarks concerning it: "In the male in my collection (with the female, probably the originals of Herrich-Schäffer's descriptions and figures) I observe distinctly only 3 spurs, the fourth may have been broken off." I have examined 3 males and 1 female. Two flown males (*Amasia*, Staudgr.) have only end spurs, but of the middle spurs not a vestige is to be seen; in the third male (*Magnesia*, Led., from Möeschler's collection) both middle spurs are present, but unusually

short. The female belonging to this male has lost one of its hind legs, and on the other there is a single middle spur—the outer one. Among four or five males only one has four spurs, one three, and two or three only apical spurs. *Alcides* must also be distinguished by a very unusual tendency to lose the middle spurs, or to vary in the number of the spurs, as does *Acidalia rusticata*, the latter of which is the more probable.

In Division C., only the male of *Mathias* has a discoidal stigma—a straight oblique streak, which separates *Mathias* directly from all other species similarly marked. The streak arises nearer the margin than usual, a little behind the middle of the dorsal vein, and ends at the first branch of the median. Its color is also different; it is not coal-black, as others, but whitish-gray and glossy. From the two other species of this Division, *Zelleri* offers no particular difference; *Nostrodamus* differs in its unusually short antennae (in this agreeing with the otherwise quite unlike American *Phyleus* Dr.), with their thicker oval club, on which is placed a short conical hooklet, as a point on the thin apical joint.

Herrich-Schaeffer places the species of the Divisions B and C in his genus *Goniloba*; but he is unable to give the difference between it and *Pamphila*.

Inachus has a more slender club than the other species, and is besides separated from them by its spotted fringe (which induced Ménétries to refer it to the genus *Pyrgus*); it has also a peculiarly colored and marked under side of the hind wings. Its place in *Pamphila*, with many other species, can be only provisional.

(To be Concluded in Following Number.)

PAPILIO CRESPHONTES CRAM.

BY JACOB BOLL, DALLAS, TEXAS.

The caterpillar of this beautiful butterfly is living here on *Xanthoxylum carolinianum*, or Prickly Ash; at least, till now I did not find it on any other plants. It can be found three times in a year, first in April and May, then in July, and again in September and October. If the cater-

pillars be touched, they stretch forth the reddish-brown fleshy fork from the neck, like all those of the genus *Papilio*. When they do not eat they are sitting rigid regularly on the surface of the leaves. It is most interesting that in this situation their appearance resembles very much the excrements of birds, on account of their color, consisting of white, gray and brown spots. This resemblance is considerably increased in the earlier stage of the larvae, which are particularly found on open places, and are thus very easily seen.

I saw these larvae for the first time in the early stage, and they deluded me in such a manner that I thought them at first to be excrements of birds fallen upon the leaves, and after further examination recognized them as larvae. This resemblance protects them naturally against their enemies, especially the birds. This likeness of the larvae to excrements of birds may seem strange to some readers, but the means and the ways of nature, whereby many insects are protected against the assaults of their enemies, are very numerous and wonderful.

The pupae of the fall brood sometimes develop in autumn when the weather is favorable, but generally not before April of the next year. As a rare occurrence, it should be mentioned that one pupa of the fall brood of 1875 was not hatched before April, 1877. This observation is very peculiar in this southern latitude, and so far as I know, has never been noticed in butterflies. Among Bombycidae this happens occasionally, and it occurred to me in the old country that pupae of the European *Saturnia carpini* hibernated twice before they were developed.

ON MERMIS, A PARASITE OF THE LARVA OF CARPOCAPSA POMONELLA.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

The interesting paper by Mr. J. A. Lintner, Entom. Contributions, No. iv., induces me to give some extracts from the papers by Prof. von Siebold, which the author could not compare himself, the more as they answer some important questions.

Stett. Ent. Zeit., 1850, p. 335 :

"*Carpocapsa pomonana* W. V.

"I examined with much interest, in the Museum in Breslau, Prussia, the specimens of hair worms communicated by different persons. Those worms were found living in the heart of the apple some years ago, very frequently in Silesia (by F. S. Leuckart, Zoolog. Bruchstuecke, Heft I., 1820, p. 5). Four of them belong to *Mermis acuminata*, and others also to *Mermis*; also a specimen in Prof. Otto's collection. The *Filaria* found in an apple by Prof. Waga will probably also be a *Mermis* (Revue Zool., 1844, p. 366)."

As I have given attention to all I found published about Helminthes in insects, I remembered to have seen some other facts stated about their presence in apples. But in comparing my notes I cannot find the work, and the most thorough research in old and new books was without success. So, till now, the above given quotations from Prof. von Siebold are the only ascertained ones.

Stett. Ent. Zeit., 1854, p. 106 :

"I saw in some letters sent to me that it seemed to be inconceivable to several Entomologists to understand how those worms can immigrate into larvae, which from the beginning of their existence live in buds or in fruits, and which never leave these trees or shrubs on which the eggs were laid. Though we have no direct observations how the *Mermis* immigrates into the caterpillar living in the apple or in the pear, I do not at all think that we are obliged to accept a spontaneous generation. We know very well that a number of lower animals leave the egg very far from the place where they shall live, and that they are obliged to make comparatively long journeys to reach the place destined for them. For instance, the Cicada, the larva of which is obliged to go into the earth, though the eggs are laid on high trees. Why should not the brood of *Mermis* generated in the earth migrate in the opposite way on flowers and trees to reach their proper abode? In the spring at certain times the whole superficies of plants is humid and preserves the worms from drying up. This supposition is corroborated by the observation of Prof. Creplin concerning the migration of another worm."

In a later paper, *l. c.* p. 32, it is stated by direct observation in England and Germany that after strong rains the brood of *Mermis* comes out of the earth and travels on flowers and shrubs in such numbers that the

old tale of "a worm-rain" could have been believed. All those worms belonged to *Mermis nigrescens*. Siebold has seen the immigration (boring into) of young *Mermis* into the larvae of *Hyponomeuta cognatella*, and Dr. Meissner into the legs of larvae of *Ephemer*a. The "boring into" is done by an armature on the head of the *Mermis* consisting of twelve movable hooks placed in a double series around, and serving later as a means of locomotion into the interior of the body of the host.

It should be remembered that the *Mermis* leaves the host later to go into the earth, and that only there the sexual parts are developed and the brood generated.

The species was first described by Rudolphi as *Filaria acuminata*, and later by Siebold as *Mermis acuminata*.

A NEW SPECIES OF PHIGALIA.

BY G. H. FRENCH, CARBONDALE, ILL.

Phigalia cinctaria, n. sp.

Wingless female.—Length .75 of an inch; exserted oviduct, .25 more. Color light gray with a very slight olive tint, and irregularly mottled all over with black; the spots large above, but smaller on the sides and beneath; the thorax nearly uniform black; the divisions between the segments pea green while alive, but turning darker in drying. Head grayish black, the clypeus black; antennae black, annulated with gray, reaching to about the middle of the body, when turned back. Hind wings reaching to the back part of the first abdominal segment, the fore wings reaching to the middle of the same segment. Feet and legs grayish black, annulated with gray. The oviduct with two joints exserted, the last third of the outer joint hairy, the hairs perpendicular to the joint. Head short, scarcely to be seen from above, rather wide between the eyes; palpi short. From a single ♀.

Chrysalis.—Length, exclusive of bristles, .55 of an inch. Dark brown, coarsely punctured, the punctures between the segments fine, the abdomen ending in a conical segment, which is smooth at the end and tipped with two short, stout, divergent bristles. Subterranean.

The moth from which the above description is taken was bred from a larva taken from an apple tree about fifty miles north of here, May 28th, 1877. It was at that time an inch long, gray, banded transversely with a number of white lines. It moulted June 6th, when all but one of the white lines were replaced by brown, the ground color remaining the same. After feeding a few days longer, it entered the ground and transformed to a chrysalis as above. At this time it was about an inch and a half long. The imago appeared March 27th, 1878.

ON THE EMERGENCE OF LEPIDOPTERA FROM THEIR COCOONS.

BY C. E. WORTHINGTON, IRVING PARK, ILL.

In the years 1856 and 1857 Capt. Thos. Hutton communicated to the London Entomological Society (Trans. v., 85) and to the Journal of the Agri-horticultural Society of India (ix., 167-9) certain observations on the means employed by the imago of *Actias selene* in obtaining exit from its cocoon. In 1857 Messrs Horsfield and Moore in their catalogue of the Lepidoptera in the Indian Museum, quote and endorse Capt. Hutton's observations, and in the course of their remarks indicate indirectly that the same methods are employed by *Antheraea paphia*, an Indian Attacian allied to our *T. polyphemus*.

In these articles the hooks on the wings and the drop of acrid liquid on the head are both noticed and the conclusion arrived at that the means employed are both chemical and mechanical. Capt. Hutton, however, states that the moth discharges this liquid from the mouth and applies it with the brush on the forehead—apparently an error, as the structure of the mouth parts would hardly admit of the secretion of such a liquid, and when secreted it could hardly be conveyed to the forehead.

On reading these notes it occurred to me that I had noticed that examples of *polyphemus* emerging from cocoons from which the top had been removed invariably carried a drop of brown liquid on the frontal tuft, and a little investigation convinced me that the liquid, so far from being secreted by the mouth, was contained in a cell underlying the conspicuous greenish spot on the pupa. This cell is ruptured from the top

by the emerging insect and leaves its contents on the forehead. Pupae in which fully formed moths had died without emerging show, on dissection, the empty cell with a sediment adhering to the forehead of the insect not only in *T. polyphemus*, but in *A. yama-mai* and other species of *Antherea* I have been able to examine in this condition.

With a view of determining the question, I prepared a number of *polyphemus* cocoons by removing the outer layers and cutting a narrow slit on opposite sides to near the head, so that when suspended in the light the motions might be watched, and in two instances have been able to see, though rather imperfectly, the whole performance. As before stated, the moth on breaking the pupa-skin carries on its forehead a drop of liquid, which, as the moth lengthens itself in the effort to free the fore legs, is smeared upon the end of the cocoon, and during the twisting and squirming accompanying this effort, well rubbed in. After freeing the legs the moth rests for a moment; then, pushing up one shoulder, turns several times in the cocoon, the shoulder being pressed against the smeared part. The result of this appears to be to loosen some of the fibres, for after two or three repetitions of this movement, the legs are extended upward and the abdomen extended, forcing the shoulders more firmly against the cocoon and a vigorous clawing begun; this is succeeded by a butting movement, the abdominal segments being first retracted and then forcibly extended, followed by more twisting, clawing and butting, until a small hole is made, when the butting movements predominate and the moth finally emerges, pushing the cut ends of the threads outward.

So far as I have been able to observe, the hooks in the wings merely serve to detach the fibres and hold them in place until broken by the powerful legs, the removal of the gum and weakening of the silk by the liquid on the head rendering this comparatively easy—this possibly being aided by the surplus fluids of the pupa being brought up during the retraction and extension I have called "butting," but whether this is really the case or not I am unable to state. A similar cell is observable in all pupae of this family, and it seems probable that they all emerge in the same manner, employing neither wholly chemical nor mechanical means, but both.

NOTE.—It is but fair to add that since these notes were prepared I have seen mention of a paper by Mr. Packard on the same subject, but as it is not in general circulation, have been unable to see the paper in question.

CORRESPONDENCE.

ON THE HONEY TUBES OF SOME BUTTERFLY LARVÆ.

DEAR SIR,—

In my paper in the July No. of the CAN. ENT., p. 136, I stated that I found a reference in "Newman's British Butterflies" to a mention by Zeller of the ants licking a conical tube in *Damon* (I think it was).

Zeller refers to C. E. Pezold in L. G. Scriba, Beitræge zu der Insecten Geschichte, 1793, Heft 3, p. 230, who states that ants often indicate the presence of the caterpillar of *Papilio Biton* = *Lycaena Damon*. "On the 11th (12th counting the head as 1st) segment are two small yellow spots. I saw a caterpillar moving them while feeding, and with the microscope I found them to be two whitish tubes protruded by the caterpillar and again invaginated. When first protruded the tube is similar to a three-cornered pyramid, the three sides of which can be opened and invaginated in the cylinder. When the caterpillar feeds, the tubes are almost incessantly thrust out and withdrawn. I never saw any fluid coming out, nor remarked any smell. I found two similar wart-like parts on the next preceding segment, but without any change of shape. The caterpillars of *Lyc. argus* and *Thecla Rubi* possess the same movable tubes in the same place, but I could not find them in *Theclas Quercus* and *Betulæ*. It is a question what is the use of these organs. Are they for defence as in *P. machaon*? I do not know whether the tubes of *Damon* are excretive organs, but I have some reason to believe they are—the more so as the ants are very busy about the caterpillars and cover them often entirely without harming them. Mr. Esper has observed the same in the caterpillars of *Lyc. Icarus*. Perhaps it is here as with Aphides, where the ants sip up the secretion. That I did not see any fluid is no reason that it does not exist."

W. H. EDWARDS, Coalburgh, W. Va.

DEAR SIR,—

I should be glad to exchange a large number of British butterflies and moths in return for good typical specimens of Canadian Lepidoptera or pupae. Address—

A. J. SPILLER, Mangotsfield, Bristol, England.

